

HATCHERY EVALUATION REPORT

Winthrop NFH - Spring Chinook

December 1996

Integrated Hatchery Operations Team (IHOT)

HATCHERY EVALUATION REPORT

Winthrop NFH - Spring Chinook

**An Independent Audit Based on Integrated Hatchery Operations Team
(IHOT) Performance Measures**

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Executive Summary

This report presents the findings of the independent audit of the Winthrop NFH - Spring Chinook program. The hatchery is located along the Methow River in north-central Washington, near the town of Winthrop. The hatchery is used for adult collection, incubation, and rearing of spring chinook and summer steelhead

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Winthrop NFH - Spring Chinook Results

The Winthrop NFH facility includes 2 ponds for adult holding, 62 concrete raceways, 46 starter tanks, and incubation facilities. The hatchery was constructed in 1942 to mitigate for fish losses in the upper Columbia River drainage caused by the construction of Grand Coulee Dam.

The Winthrop NFH - Spring Chinook program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal. The audit found that the hatchery did not have current water quality data showing compliance with IHOT standards and was not in compliance with the pathology-free water criteria and was lacking some alarm systems, which are all facilities requirements. The hatchery also was not in compliance with the adult holding criteria, did not have enough useable rearing space for the full program and needed to upgrade the pollution abatement facilities. In the compliance area for Hatchery Practices, the hatchery did not have written incubation standards for the incubation buckets, did not meet the release number or size goals. In the compliance area for fish health policy, the hatchery did not have a pathogen free water supply and did not use foot baths at the incubation facility. As with program objectives, in the area of ecological interactions the hatchery did not have a smoltification goal in place. Likewise, the hatchery did not have a Genetics Monitoring and Evaluation Program.

The specific areas in which the Winthrop NFH - Spring Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Develop alarm log
- Develop disease-free water supply for incubation and early rearing
- Develop pathogen free water supply and implement IHOT sanitation procedures
- Develop genetics M&E plan and have it reviewed by a geneticist
- Establish criteria for incubation buckets
- Implement checking procedures for alarms

- Implement use of foot baths according to IHOT protocols
- Improve pollution abatement pond and system to meet current engineering practice
(currently under design)
- Install flow/level alarms at the intake
- Review release size goal to reflect hatchery conditions and current management policy.
- Monitor and record dissolved nitrogen
- Monitor and record DO
- Monitor the facility security and take appropriate actions if needed
- Provide smoltification data
- Replace A and B - Bank with 64 - 8 x 80 raceways (based on equivalent F-L Volume)
- Replace C - Bank with 32 - 8 x 80 raceways (based on equivalent F-L Volume)
- Run analysis for alkalinity and hardness
- Run analysis for IHOT-listed contaminants
- Run analysis for turbidity
- Run analysis on nitrites
- Run chemical analysis for IHOT water quality parameters

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.

Facility Description

Name: Winthrop National Fish Hatchery (operated as a part of the
Leavenworth National Fish Hatchery Complex)

Stock/Species: Spring Chinook
Summer Steelhead

Operating Agency: U.S. Fish and Wildlife Service
Funding Agency: U.S. Fish and Wildlife Service
Location: Winthrop NFH is located along the Methow River in north-central
Washington, near the town of Winthrop.

Address: Winthrop National Fish Hatchery
Leavenworth National Fish Hatchery Complex
U.S. Fish and Wildlife Service
12790 Fish Hatchery Road
Leavenworth, WA 98826

Hatchery Manager: Mr. Bill Wallien
Phone: (509) 996-2424
Fax: (509) 996-3207

Purpose: The hatchery was originally authorized as part of the Grand Coulee
Fish Maintenance Project. The first fish cultural operation began in
1942 by trapping adult sockeye, chinook, and steelhead at Rock Island

Dam and transporting them to the hatchery. By 1951, the station was rearing sockeye, chinook, steelhead, kokanee, coho, and resident trout.

The goal of Winthrop Hatchery is to produce spring chinook to help compensate for fish losses in the upper Columbia River drainage caused by the construction of Grand Coulee Dam.

Production Goal:

Spring Chinook

Produce 1 million yearling spring chinook for on-station releases

Summer Steelhead

Produce 100,000 smolts for on-station release

Water Supply:

Water rights total 29,930 gpm from the Methow River, Spring Branch Spring, and two wells (6,000 gpm total capacity). Water use ranges from 8,528 to 27,686 gpm with the Methow River providing the majority of the flow.

Facilities:

Adult Holding:

Adults held in upper end of fish ladder

2 large concrete adult holding ponds (not used)

Incubation:

400 individual bucket incubators for green to eye-eggs

Vertical tray incubators (336 trays)

Early Rearing:

46 starter tanks

Raceways:

30 raceways - 1,300 cf each

16 Converted Foster-Lucas ponds - 2400 cf each

16 Foster-Lucas ponds - 2400 cf each

Rearing Ponds: none

Satellite Facilities: none

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

- | | |
|-----------|--|
| Section 1 | Performance Measures for General Information and Expenditure Information (PMs General 1-2) |
| Section 2 | Performance Measures for Program Objectives (PMs 1-4) |

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 3	Performance Measures for Facility Requirements (PMs 5-15)
Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and onsite visits. The site visit at the Winthrop NFH was conducted on October 22-23, 1996.

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.
3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That Compliance Report is Table 2 of this report.
5. Information from steps 1-4 was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Winthrop NFH - Spring Chinook

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (4) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Winthrop NFH - Spring Chinook program. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Winthrop NFH - Spring Chinook

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Winthrop NFH					
Adult Collection	4					
Adult Holding	4					
Spawning	4					
Fertilization	4					
Incubation	4					
green-to-eyed	4					
eyed-to-hatch	4					
Rearing	4					
fry	4					
fingerlings	4					
smolts	4					
Acclimation/release	4					

In 1993/1994, eggs were obtained from Leavenworth NFH to fill shortfall; practice has stopped.

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan and the Columbia River Fish Management Plan (US -vs- Oregon)	
#2	Is the hatchery operating under a current hatchery operational plan? Is it understood by staff? Is it being followed?		4 4 4			IHOT Operations Plan and Facility O&M Manual	
#3	Is a hatchery monitoring and evaluation plan in place? Do you have a written monitoring and evaluation plan?		4			Hatchery Evaluation Team 5-yr Plan for Leavenworth, Entiat, Winthrop NFH	
#4a	Adult contribution to fisheries, spawning grounds, and hatchery		4			Review of records	
#4b	Adult pre-spawning survival as compared with established goal		4			Review of records; in compliance 5 out of last 5 years	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#4c	Egg-take as compared with established hatchery goal				4	Review of records; in compliance 3 out of last 5 years	Increase adult returns
#4d	Green-egg to eyed-egg survival as compared with established goal		4			Review of records; in compliance 5 out of last 5 years	
#4e	Eyed-egg to fry survival as compared with established goal		4			Review of records; in compliance 4 out of last 4 years	
#4f	Fry to smolt survival as compared with established goal				4	Review of records; in compliance 2 out of last 5 years. Remedial actions to solve earlier problems with BKD and predation have been addressed. Monitor the effectiveness of actions taken to increase smolt survival	None
#4g	Production as compared with established goal				4	Review of records; in compliance 2 out of last 4 years	Increase adult returns
#4h	Percent survival (smolt to adult) as compared with established goal				4	Review of records; in compliance 0 out of last 5 years	Increase adult returns
#4i	Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs	4				Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5a	Temperature						
	Does your water temperature meet the criteria for spawning?		4			Review of records/Discussion	
	Does your water temperature meet the criteria for incubation?		4			Review of records/Discussion	
	Does your water temperature meet the criteria for rearing?		4			Review of records/Discussion	
#5b	Dissolved gases						
	Is the oxygen level near saturation?			4		No current data.	Monitor and record DO
	Is the dissolved nitrogen level less than saturation?			4		No current data. Submitted 1982 data showed a problem but the hatchery feels the actions they have taken has solved the nitrogen problem	Monitor and record dissolved nitrogen
#5c	Chemistry						
	Ammonia (un-ionized)			4		No data since 1982	Run analysis
	Carbon Dioxide			4		No data since 1982	Run analysis
	Chlorine			4		No data since 1982	Run analysis
	pH			4		No data since 1982	Run analysis
	Copper			4		No data since 1982	Run analysis
	Hydrogen Sulfide			4		No data since 1982	Run analysis

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Iron			4		No data since 1982	Run analysis
	Zinc			4		No data since 1982	Run analysis
#5d	Turbidity						
	Does your turbidity meet the criteria?			4		No data since 1982. The 1982 data showed acceptable levels	Run analysis

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5e	Alkalinity and hardness Does your alkalinity and hardness meet the criteria?			4		No data since 1982. All supplies in 1982 samples are all in compliance	Run analysis
#5f	Nitrite Does your nitrite meet the criteria?			4		No data since 1982	Run analysis
#5g	Contaminants Aldrin Endrin Dieldrin Heptachlor Chlordane Methoxychlor Lindane Malathion Guthion			4 4 4 4 4 4 4 4 4		No data No data No data No data No data No data No data No data No data	Run analysis Run analysis Run analysis Run analysis Run analysis Run analysis Run analysis Run analysis Run analysis
#5h	Pathogens What portions of the hatchery have disease-free water? Adult holding				4	Pathogens have also been found in infiltration wells.	Hatchery is generally able to control diseases

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Incubation				4	See above	See above
	Early rearing				4	See above	See above
	Rearing				4	See above	See above
	Others (Acclimation)				4	See above	See above

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#6	Alarm Systems						
	Do the following areas have alarms?						
	Intake				4	Inspection/Discussion	Install flow/level alarms at the intake
	Large rearing ponds and adult holding ponds		4			Inspection/Discussion	
	Raceway headboxes and rearing ponds		4			Inspection/Discussion	
	Incubation facilities		4			Inspection/Discussion	
	Quarantine areas and facilities	4				Inspection/Discussion	
	Water treatment systems	4				Inspection/Discussion	
	Security				4	Security has not been a problem with hatchery staff on-site	Monitor the facility security and take appropriate actions if needed
	Are there outside systems and buzzers in onsite residences?		4			Discussion	
#6	Are water flow alarms checked daily?		4			Review of records/Discussion	
	Are all other alarms checked weekly?				4	Discussion	Implement alarms checking procedures
	Is there a log of alarms for emergencies, tests, and maintenance requirements?				4	Review of records/Discussion	Establish alarm log
	Are telephone pagers used?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#7	Adult collection and holding facilities				4	Construction of the adult holding structure is incomplete. Adult capture and spawning is conducted in the entrance channel, which is inadequate	Rebuild adult holding facility

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#8	Incubation facilities						
	<p>Type 1: <u>Marisource Vertical Trays</u></p> <p>Do you have an adequate number of units for the overall program?</p> <p>Type 2: <u>Incubation Buckets</u></p> <p>Do you have an adequate number of units for the overall program?</p>		4			<p>Inspection of facilities/Discussion</p> <p>Inspection of facilities/Discussion</p>	
#9	Rearing facilities						
	<p>Type 1: <u>Starter Tanks</u></p> <p>Do you have an adequate number of units for the overall program?</p> <p>Type 2: <u>8x80 Raceways (D & E Bank)</u></p> <p>Do you have an adequate number of units for the overall program?</p>		4		4	<p>Discussion</p> <p>To rear full Chinook and Summer Steelhead programs additional raceways are required. See below</p>	<p>Provide sufficient capacity for full program without Banks A, B and C</p>

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	<p>Type 3: <u>12x102 Raceways (C-bank)</u></p> <p>Do you have an adequate number of units for the overall program?</p> <p>Type 4: <u>Foster Lucas Ponds (A & B Bank)</u></p> <p>Do you have an adequate number of units for the overall program?</p>				<p>4</p> <p>4</p>	<p>Raceways are converted Foster Lucas ponds. These facilities are near the end of their useful life. Suited to short term use</p> <p>Foster Lucas Ponds are past their useful life</p>	<p>Replace C- Bank with 32 - 8 x 80 raceways (based on equivalent F-L Volume)</p> <p>Replace A and B- Bank with 64 - 8 x 80 raceways (based on equivalent F-L Volume)</p>
#10	<p>Screening facilities</p> <p>Do you meet the approach velocity criteria?</p> <p>Are the fish screens regularly cleaned?</p> <p>Does the screen mesh meet screen opening criteria?</p> <p>Are rearing containers double screened for fish that should not be released to adjacent water?</p>	<p></p> <p></p> <p></p> <p>4</p>	<p>4</p> <p>4</p> <p>4</p>			<p>Inspection of facilities/Discussion</p> <p>Inspection of facilities/Discussion</p> <p>Inspection of facilities/Discussion</p> <p>Fish are released in subbasin</p>	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#11	<p>Predator control facilities</p> <p>Are your predation control facilities effective?</p>		4			<p>A & B portable nets are moderately effective, C - effective; D & E - New covers and side fencing</p>	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#12	<p>Food storage facilities and quality control</p> <p>Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations?</p> <p>Does a regional quality control officer oversee production procedures and monitor:</p> <p>Verification by feed manufacturer that ingredients meet specifications?</p> <p>Ensure feed does not contain unwanted drugs or other additives?</p> <p>Analyze ingredients contained in the final food product to ensure that feed specifications have been met?</p> <p>Are the foods stored and handled according to the following criteria?</p>		4			Discussion	
			4			Discussion; Ann Gannan, Fish Nutritionist, Abernathy SCTC	
			4			Discussion	
			4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Moist pellets should not exceed 10°F at point of delivery.		4			Discussion	
	Moist pellets should be removed from freezer just prior to feeding.		4			Discussion	
	Do not leave buckets of feed or feed containers outside exposed to light or heat.		4			Discussion	
	Open bags of feed should be fed within 1 to 2 days except when feeding small groups of fish.		4			Discussion	
	Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).	4				Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#13	Release facilities Do the release facilities ensure that fish are not subjected to adverse conditions?		4			Inspection of facilities/Discussion	
#14	Pollution abatement facilities Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)? Are pollution abatement facilities operated correctly?		4		4	Inspection of facilities/Discussion Discussion	Improve pollution abatement pond and system to meet current engineering practice (currently under design)
#15	Transportation facilities Are the transport systems adequate to meet IHOT performance measures for transportation practices?	4				Released on station	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	Broodstock selection practices						
	Is the donor selection process document attached? (PM #40a)	4				Existing program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock? (PM #40b-c)	4				Existing program; does not apply	
#17	Spawning practices						
	Were the appropriate number of spawners, male/female ratios, and fertilization protocols used? (PM #42c-g)		4			Review of records/Discussion	
#18	Incubation practices						
	Are specific incubation standards listed in the hatchery operations plan?				4	Reviewed IHOT Operations Plan and Hatchery O&M. Yes for vertical trays, no for the incubation buckets	Establish criteria for incubation buckets
	Are incubation practices written?				4	See above	Establish criteria for incubation buckets

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Incubation Type 1: <u>Vertical Inc. Trays (Marisource)</u> (see PM #8) Do you meet the loading and flow criteria?		4			Review of records/Discussion	
	Incubation Type 2: <u>Incubation Buckets</u> (see PM #8) Do you meet the loading and flow criteria?			4		No IHOT or facility criteria for incubation buckets	Establish criteria for incubation buckets

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#19	Rearing practices						
	Are specific rearing standards listed in the hatchery operations plan?		4			Review of IHOT Hatchery Operations Plan and Station Manual	
	Are rearing practices written?		4			Review of Hatchery Operations Plan	
	Rearing Unit Type 1: <u>Starter Tanks</u> (see PM #9)						
	Do you meet the density and DI criteria?		4			Hatchery uses DI criteria lower than the IHOT	
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	
	Rearing Unit Type 2: <u>Raceways</u> (see PM #9)						
	Do you meet the density and DI criteria?		4			Review of records/Discussion	
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	
#20	Rearing Unit Type 3: <u>Foster Lucas (A & B)</u> (see PM #9)						
	Do you meet the density and DI criteria?		4			Review of records/Discussion	
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	
#20	Smolt quality						
	Do you produce a high quality smolt?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#21	Fish health management practices						
	Are the monthly hatchery monitoring visits being conducted? (PM #26)		4			Review of records/Discussion	
	Are the annual broodstock inspections being conducted? (PM #27)		4			Review of records/Discussion	
	Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)				4	Discussion	Develop pathogen-free water supply and implement IHOT sanitation procedures
	Are the following water quality parameters within criteria? (PM #5a-5g)						
	Water temperature		4			Review of records/Discussion	
	Dissolved gases			4		No Data	See PM # 5b
	Chemistry			4		No Data	See PM # 5c
	Turbidity			4		No Data	See PM # 5d
	Alkalinity and hardness			4		No Data	See PM # 5e
	Nitrite			4		No Data	See PM # 5f
	Contaminants			4		No Data	See PM # 5g
	Are rearing standards being followed? (PM #19)		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Are egg and fish transfer/release requirements met? (PM #31)		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a	Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?						
#22a1	Percent smoltification Do you measure percent smoltification? Did you have a smoltification goal? Did you meet the smoltification criteria?		4			Discussion, ATPase completed by NBS lab Discussion Discussion. No data	Provide smoltification data.
#22a2	Rearing density (prior to release) Did you meet the rearing density criteria just prior to release?		4			Review of records/Discussion	
#22a3	Disease condition (at release) Did you meet all disease regulations just prior to release?		4			Review of records/Discussion	
#22a4	Number (at release) Did you meet the release number goal?				4	Review of records/Discussion	Improve adult returns and fry to smolt survival

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#22a5	Size at release Did you meet the size goal?				4	Hatchery uses higher temp ground water to reduce disease potential	Review release size goal to reflect hatchery conditions and current management policy.
#22a6	Dates of release Did you meet the release date goal?		4			Review of records/Discussion	
#22a7	Location of release Did you release the fish at the specified location?		4			Review of records/Discussion	
#22b	Are fish reared in the subbasin or acclimated in the subbasin? Are the fish reared in the subbasin? Are the fish acclimated in the subbasin?		4 4			Discussion Discussion	
#22c	Is the release strategy appropriate for the program?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23	Transportation facilities						
	Do transportation equipment and personnel receive disinfection before and after use?	4				No transportation for this stock	
	Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?	4				See above	
	Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?	4				See above	
	Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?	4				See above	
	Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?	4				See above	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	200 ppm chlorine for 30 minutes	4				See above	
	600 ppm quaternary ammonia compound for 30 minutes	4				See above	
	200 ppm iodophor solution for 10 minutes	4				See above	
	Do personnel wear protective garments when handling fish eggs or cultural water?	4				See above	
	Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?	4				See above	
	Is a daily service inspection completed before starting up and leaving for the day?	4				Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23 (cont)	Transportation facilities						
	Does the fish transport unit receive an inspection prior to loading?	4				See above	
	Does a pre-loading inspection covering tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit?	4				See above	
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?	4				See above	
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?	4				See above	
	Is water temperature in the transportation unit maintained within the 42-48 °F range?	4				See above	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Do fish releasing procedures include the following criteria?	4				See above	
	Releasing the fish at the correct release site or into the correct water body.	4				See above	
	Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.	4				See above	
	The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.	4				See above	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#24	Evaluation practices						
	Has the hatchery conducted fishery contribution studies to:						
	Determine the requirements for evaluating and improving management programs?		4			Discussion	
	Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?		4			Discussion	
	Develop guidelines that define if the proper stocks of fish are currently being used?		4			Discussion	
	Determine which management units contribute to a specific fishery and the time periods of those contributions?		4			Discussion	
	Determine the relative contributions of the various management units to a specific fishery over the different time periods?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#25	Training practices						
	Does the hatchery have a training schedule for its staff?		4			Review of records/Discussion	
	Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		4			Review of records/Discussion	
	Does the hatchery routinely exchange training details between other hatcheries and agencies?		4			Review of records/Discussion	
	Does the hatchery encourage and reward off-duty training of staff?		4			Review of records/Discussion	
	Does the hatchery conduct monthly staff meetings?		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?						
	Conduct visit at least monthly		4			Review of records/Discussion	
	Monitoring conducted by qualified fish health specialist		4			Review of records/Discussion	
	Examine a representative sample of healthy and moribund fish from each lot.		4			Review of records/Discussion	
	Review fish culture practices with hatchery manager.		4			Review of records/Discussion	
	Report finding and results of necropsies on standard form.		4			Review of records/Discussion	
	Recommend appropriate drug or chemical treatment.		4			Review of records/Discussion	
	Summarize fish health status or stock prior to release or transfer to another facility.		4			Review of records/Discussion	
#27	Are all of the functions of the hatchery yearly monitoring visits being completed as described below?						

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Annually examine each broodstock for the presence of reportable viral pathogens.		4			Review of records/Discussion	
	Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .		4			Review of records/Discussion	
	Conduct inspection by or under the supervision of qualified fish health specialist.		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#28	Is the hatchery following accepted sanitation procedures?						
	Are there any sources of pathogen-free water, especially for incubation and early rearing?				4	Discussion	Develop disease free water supply for incubation and early rearing
	Are the hatchery sanitation procedures understood and being followed as described below?						
	Disinfect/water harden eggs in iodophor?		4			Inspection of facilities/Discussion	
	Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?				4	Inspection of facilities/Discussion	Implement use of foot baths per IHOT
	Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?		4			Inspection of facilities/Discussion	
	Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		4			Inspection of facilities/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?	4				No transfers from this facility	
	Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		4			Inspection of facilities/Discussion	
	Are dead fish properly disposed of?		4			Inspection of facilities/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#29	Are water quality parameters being followed?						
	Are the following water quality parameters within criteria? (PM #5a-5g)						
	Water temperature		4			Review of records	
	Dissolved gases			4		No Data	See PM # 5b
	Chemistry			4		No Data	See PM # 5c
	Turbidity			4		No Data	See PM # 5d
	Alkalinity and hardness			4		No Data	See PM # 5e
	Nitrite			4		No Data	See PM # 5f
	Contaminants			4		No Data	See PM # 5g
	Go to PM #21						
#30	Are incubation and rearing standards being followed?						
	Are the incubation practices following the IHOT incubation criteria? (PM #18)			4		Review of records/Discussion	Establish criteria for incubation buckets
	Are the rearing practices following the IHOT criteria? (PM #19)		4			Review of records/Discussion	
	Go to rearing practices PM #18-PM #19						
#31	Are egg and fish transfer/release requirements met?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	Is the hatchery's program outlined in a subbasin management plan? Go to subbasin plan PM #1		4			Columbia Basin System Planning Production Plan and the Columbia River Fish Management Plan (US -vs- Oregon)	
#33	Is the hatchery operating under a current hatchery operational plan? Go to operational plan PM #2		4			IHOT Operations Plan and Facility O&M Manual	
#34	Is a hatchery monitoring and evaluation plan in place? Go to hatchery monitoring and evaluation plan PM #3		4			Hatchery Evaluation Team 5 yearr Plan for Leavenworth, Entiat, Winthrop NFH	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#35	Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?						
	Does the hatchery program meet the requirements for the following?						
	Species protocols (PM #4a)		4			Review of records/Discussion	
	Stock protocols (PM #4a)		4			Review of records/Discussion	
	Broodstock collection location protocols (PM #41b)		4			Review of records/Discussion	
	Broodstock numbers protocols (PM #42c)		4			Review of records/Discussion	
	Broodstock collection strategy protocols (PM #41b-d)		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Spawning protocols (PM #42d-e)		4			Review of records/Discussion	
	Egg-take protocols (PM #42f-g)		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#36	Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?						
	Percent smoltification (PM #22a1)				4	No goal	Establish appropriate smoltification goal
	Rearing density (PM #22a2)		4			Review of records/Discussion	
	Disease condition (PM #22a3)		4			Review of records/Discussion	
	Number at release (PM #22a4)				4		Improve adult returns
	Size at release (PM #22a5)				4		See PM #22a5.
	Date of release (PM #22a6)		4			Review of records/Discussion	
	Location of release (PM #22a7)		4			Review of records/Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#37	Are fish reared in the subbasin or acclimated in the subbasin? See PM #22b		4			Discussion	
#38	Is the release strategy appropriate for the program? See PM #22c		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#39	For new programs, has a broodstock collection plan been developed?						
	Is the broodstock collection plan written?	4				Existing Program; does not apply	
	For a non-captive broodstock program:	4				Existing Program; does not apply	
	Was an unbiased, representative sample collected?						
	Was the recommended number of broodstock collected?	4				Existing Program; does not apply	
	For a captive broodstock program:						
	Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?	4				Existing Program; does not apply	
	Were full-sib crosses avoided?	4				Existing Program; does not apply	
	Is the broodstock collection plan understood and being followed by staff?	4				Existing Program; does not apply	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#40	For a new program, was the donor selection outline followed in selecting the hatchery broodstock?						
#40a	Is a donor selection plan written?	4				Existing Program; does not apply	
#40b	Was the donor selection outline followed in selecting the broodstock?	4				Existing Program; does not apply	
#40c	Was the target stock recommended in the donor selection process actually used?	4				Existing Program; does not apply	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#41	For existing programs, were the broodstock collection procedures followed?						
#41a	Is the broodstock collection plan written?		4			Review of broodstock collection plan	
	Does the broodstock collection plan follow the guideline:						
#41b	Was an unbiased, representative sample collected?		4			Discussion	
#41c	Was the recommended number of broodstock collected?		4			Discussion	
#41d	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#42	Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?						
#42a	Are the spawning protocols written?		4			Review of spawning protocols	
#42b	Are daily or weekly spawning logs available?		4			Review of records	
#42c	Was the appropriate number of spawners used?		4			Discussion	
#42d	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?		4			Discussion	
#42e	Was the sex-ratio within the limits given in the performance standards?		4			Discussion	
#42f	Were the fertilization protocols followed?		4			Discussion	
#42g	If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?		4			Discussion	

Table 2 Winthrop NFH - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#43	Is there a genetics monitoring and evaluation program in place?						
	Is a genetics monitoring and evaluation program available?				4	No plan provided	Develop genetics M&E plan and have it reviewed by a geneticist.
	Does the plan address the following elements listed in IHOT:						
	Does the program have elements needed to meet evaluation goals 1-4?				4	Discussion	See above
	Has a qualified geneticist reviewed and endorsed the program (goal 5)?				4	Discussion	See above
	Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?				4	Discussion	See above
	Is the program understood and followed by staff?				4	Discussion	See above

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Winthrop NFH - Spring Chinook

This section presents the corrective actions required to bring the Winthrop NFH - Spring Chinook program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Winthrop NFH - Spring Chinook

Remedial Action Required	Cost	PMS ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Implement alarm checking procedures	----	6
Develop alarm log	----	6
Establish criteria for incubation buckets	----	18
Review release size goal to reflect hatchery conditions and current management policy.	----	22a5, 36
Implement use of foot baths according to IHOT protocols	----	28
Develop genetics M&E plan and have it reviewed by a geneticist	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Monitor and record DO	----	5b,21,29
Monitor and record dissolved nitrogen	----	5b,21,29
Run chemical analysis for IHOT water quality parameters	----	5c,21,29
Run analysis for turbidity	----	5d,21,29
Run analysis for alkalinity and hardness	----	5e,21,29
Run analysis on nitrites.	----	5f, 21,29
Run analysis for IHOT-listed contaminants	----	5g, 21,29
Provide smoltification data	----	22a1

Remedial Action Required	Cost	PMs ²
Type 4 - Remedial actions requiring significant capital expenditures		
Install flow/level alarms at the intake.	\$5,000	6
Replace C- Bank with 32 - 8 x 80 raceways (based on equivalent F-L Volume)	\$635,000 to \$750,000	9
Replace A and B- Bank with 64 - 8x80 raceways (based on equivalent F-L Volume)	\$1.3 - \$1.5 million	9
Improve pollution abatement pond and system to meet current engineering practice (currently under design)	\$500,000	14
Develop disease-free water supply for incubation and early rearing	\$800,000	21, 28
Improve pollution abatement pond and system to meet current engineering practice (currently under design)	\$500,000	14
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Monitor the facility security and take appropriate actions if needed	----	6
Rebuild the adult collection facility	\$100,000 to \$1.5 million	7
Increase adult returns and fry to smolt survival	----	4c, 4g, 4h, 22a4, 36

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Winthrop NFH - Spring Chinook program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Winthrop NFH - Spring Chinook**

Year	Fisheries (Broodyear)	Spawning Grounds¹ (Broodyear)	Hatchery¹ (Broodyear)	Total Combined Contribution (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					

Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1983					
1984					
1985					
1986					
1987					
1988					
1989				225	0.0213%
1990				not available	
1991				not available	
1992					

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the Winthrop NFH - Spring Chinook program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a, 5b, 5c, etc).

Table 5. Annual Operating Expenses: Winthrop NFH - Spring Chinook

Hatchery	1993	1994	1995
1. Winthrop	\$369,273	\$367,690	\$950,773
2.			
3.			
4.			
5.			
Total Program Costs	\$369,273	\$367,690	\$950,773

The total expenditures for the Winthrop NFH are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery are presented in separate tables (Table 6a, 6b, 6c, etc).

Table 6. Annual Operating Expenses - Winthrop NFH

Program	1993	1994	1995
1. Spring Chinook	\$369,273	\$367,690	\$950,773
2. Summer Steelhead	\$0	\$0	\$143,327
3.			
4.			
5.			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100

Table 5a. Annual Operating Expenses: Winthrop NFH - Spring Chinook

Expenditure Occurring at Winthrop NFH

Component	1993	1994	1995
Personnel Costs	\$219,647	\$202,742	\$201,650
Operational Costs	\$149,626	\$164,948	\$102,450
Capital Costs			\$790,791
Indirect Costs			
Lumped Hatchery Costs			
Lumped Third-Party Costs			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100
Source of Funds			
Fish & Wildlife Service	100%	100%	100%
Program Production (lb)	43,137	35,128	24,632
Total Production (lb)	43,137	35,128	28,347
Program as Percent of Total	100%	100%	86.9%
Program Costs	\$369,273	\$367,690	\$950,773

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 6a. Detailed Expenditures at Winthrop NFH by Program

Spring Chinook

Component	1993	1994	1995
Personnel Costs	\$219,647	\$202,742	\$201,650
Operational Costs	\$149,626	\$164,948	\$102,450
Capital Costs			\$790,791
Indirect Costs			
Lumped Hatchery Costs			
Lumped Third-Party Costs			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100
Source of Funds			
	100%	100%	100%
Program Production (lb)	43,137	35,128	24,632
Total Production (lb)	43,137	35,128	28,347
Program as Percent of Total	100%	100%	86.9%
Program Costs	\$369,273	\$367,690	\$950,773

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 6b. Detailed Expenditures at Winthrop NFH by Program

Summer Steelhead

Component	1993	1994	1995
Personnel Costs	\$219,647	\$202,742	\$201,650
Operational Costs	\$149,626	\$164,948	\$102,450
Capital Costs			\$790,791
Indirect Costs			
Lumped Hatchery Costs			
Lumped Third-Party Costs			
Total Hatchery Costs	\$369,273	\$367,690	\$1,094,100
Source of Funds			
	100%	100%	100%
Program Production (lb)	0	0	3,715
Total Production (lb)	43,137	35,128	28,347
Program as Percent of Total	0%	0%	13.1%
Program Costs	\$0	\$	\$143,327

When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

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